thracite region there were 600 fatalities or 3.32 per 1,000 employes, as against 624 or 3.56 per 1,000 employes in 1913, a decrease of 3.85 per cent. In the bituminous region there were 413 fatalities or 2.11 per 1,000 employes, as against 611 or 3.22 per 1,000 employes in 1913, a decrease of 32 per cent.

The production per life lost in the anthracite region was 151,982 tons and has never been equalled since the first anthracite law was enacted in 1870. The nearest record was in 1913 when 146,838 tons were produced. The production per life lost in the bituminous region was 353,231 tons, as against 283,086 in 1913. This record has been equalled only four times in forty years, in 1886, 1888, 1897 and 1912,

In providing against accidents, the large operating companies have a great advantage over the small ones. Many of them have specialized in safety methods and give every consideration to the welfare of the workmen. The installation of new devices and the changes in the methods of mining today are generally preceded by the statement and interrogation, "It pays; but is it safe?" or "It is a clever solution of the problem; but is it injurious to the employe?" The average number of accidents, however, remains about the same for both classes of companies. This seemingly contradictory condition is due to the fact that occasionally a great disaster, a life-wrecking explosion of gas and dust, that cannot be effectively guarded against, will come to one of the big mines and the record is spoiled. Where the specialized efforts of the large companies prove effective is in lessening the number of accidents from falls, cars and other causes that exact a continuous toll of life in all mines.

CAGE ACCIDENTS IN SHAFTS

Three accidents of an unusual character and most disastrous in results occurred during the year in connection with the use of cages in shafts. The first occurred in the Nineteenth district, April 22, at the Pine Hill shaft of the Pine Hill Coal Company, resulting in the loss of four lives; the second in the Eighteenth district, May 29, at the Maryd shaft of the Maryd Coal Company, resulting in the loss of six lives, and the third in the Third district, December 9, at the Diamond shaft of the Delaware, Lackawanna and Western Railroad Company, resulting in the loss of thirteen lives.

These accidents occasioned a great deal of comment and the operating companies were severely criticised, particularly by the persons who are always finding fault with the way in which mining operations are conducted, especially in the anthracite region.

The critics insisted that the present cages in use in the shafts, constructed of wood and steel, were unreliable and unsafe and should be replaced by steel cages. It may be stated, however, that experience has shown that steel cages are not any safer than those constructed of wood and steel, and as an argument supporting this assertion, it is pointed out that accidents to steel and wood cages as reported above have been extremely rare, not exceeding probably a half dozen in the history of anthracite mining, which dates back to 1870.

In connection with the installation of entirely steel cages, the Chief of the Department of Mines was quoted as saying that the expense would be so great that the companies could scarcely be expected to make the change. As a matter of fact, however, the steel cages are not as expensive as those now in use.

The great notoriety given the Diamond shaft disaster in the Third district led to the introduction of a bill in the Legislature of 1915 providing that no persons should be conveyed into or out of a mine by way of a perpendicular shaft except in cages of steel frame construction.

This bill, which did not include the bituminous mines, was an unfair and unnecessary measure, like a good deal of the legislation proposed from time to time in connection with anthracite mining operations; but it passed the House during the excitement created by the accident. It was then referred to the Committee on Mines and Mining of the Senate, April 13, and that was the last heard of it. There was no fight made either in the House or the Senate against this measure by any of the coal companies, and no doubt if it had been the opinion of the Senate Committee that its enactment would give additional safety to the mine workers there would have been no opposition to it whatever in that body.

In the first accident referred to in this article, a self-acting-cage, due to some unknown cause, failed to act properly and dumped the men that were riding on it into the shaft.

Owing to the very unusual character of the accident, a rigid examination was made as to the cause. At the inquest a number of witnesses were examined, but no one could advance a reason for the failure of the cage to work. The cage was examined after the accident and it was found to be in perfect working order. The Department named a number of Inspectors to investigate the matter in connection with the Inspector of the district, Mr. M. J. Brennan. This Committee after a careful investigation agreed that the shaft was in safe condition, but could give no cause for the accident. They, however, submitted two reasons, either of which might have been the cause.

"First. The cage being automatic or self-dumping has an iron plate 6 inches wide by $\frac{5}{8}$ inch thick running parallel with the cage shoe. Above the top of the cage there is a piece of similar iron extending to the shaft guide which is shaped to act as a shoe independent of the cage shoes to prevent the automatic part of the cage from working. There is a pit in the bottom of the cage that holds the cars in position. At the ends of this pit bars are placed across the cage to keep the men from falling out while being hoisted.

The men have a habit of removing one of these bars and getting on the end of the cage. It is so balanced that one person's weight will move it throwing the shoe forward and tight against the guide. Should any of the joints where the guides connect extend, this shoe would enter and fracture the guide, permitting the cage to fall into the shaft.

Second. One or more of the men who might have been standing on the edge of the cage may have fallen towards the end of the shaft and the cage striking him could have been upset. There were several cages of men hoisted the afternoon of the accident, one a few minutes before the accident. One of the engineers, James Smith, employed there 7 years, stated that he had never had any trouble with the cage. Henry Krobart, who rode on same cage on the load previous to accident, stated that there was no sign of any obstructions and the ride was very smooth.

The Commission requested the superintendent to have the top of the shoe which controls the automatic part of the cage turned or flared more backwards from the guides to guard against any chance of penetrating them, and also that he provide some device that would reach across and connect the two sections of the cage to prevent the possibility of a like occurrence in the future."

In the second accident, it seems that the engineer lost control of the engine and the cage was thereby hoisted into the sheave wheel and some of the occupants thrown back into the shaft, others into the chute.

No testimony was adduced at the inquest to show why the engineer had failed to control the engine. An effort was made to show that he had been drinking, but no satisfactory proof of this charge was offered. The verdict of the jury was as follows:—

"We, the jury, find that six men were killed at Maryd shaft on May 29, 1914, at 3.15 o'clock, by Engineer David Williams pulling the cage past the usual top landing where the men get off. We find that the said David Williams had taken an intoxicating drink a short time before entering on his duties. We also believe that the company officials at Maryd Colliery had knowledge of engineer David Williams's habits.

We recommend that the Maryd Coal Company officials be more strict in having safety chains and other safety devices applied. And we strictly recommend more precaution in selecting engineers."

The Inspector of the district, John Curran, stated in his report of the accident that "the suggestions offered in the verdict in regard to safety appliances are not warranted by the evidence, as the company's engine is supplied with a standard cut-off (the Nicholson Automatic) and their cages have had safety chains attached for over two years, but in this case the bottomman had failed to put them on. If the chains had been in place they might possibly have done some good."

In the third accident, from some unknown cause the cage, on which the men were descending into the shaft, gave way and the men were precipitated to the bottom of the shaft.

A great deal of testimony was given at the inquest in an effort to prove that the cage was in a dangerous condition and that the company should not have allowed the men to be lowered. Other testimony, however, showed that the cage had been examined the morning of the accident or the night before and found safe. Several witnesses declared that the wrecking of the cage was caused by a dynamite explosion and it was proved that one of the men had had a box of dynamite on the cage, many of the sticks having been found afterward. No satisfactory opinion can be given as to the cause of this accident owing to the conflicting testimony.

The verdict of the jury was as follows:—

"We, the jury, appointed by the coroner of Lackawanna county to investigate into the cause of the death of thirteen men killed while being lowered into the Tripp shaft, owned and operated by the Delaware, Lackawanna and Western Railroad Company, on the morning of December 9, 1914, at or about 6.20 o'clock, do find:

That Article 12, rule 16, page 33, of the Pennsylvania Anthracite mine laws, which reads, 'that not more than ten men shall at any one time be allowed to enter or leave the mine on any one trip of the carriage,' has been violated. We suggest that some arrangement be erected or devised to prevent men from entering or approaching the cage, only from the side where the headman is located or stationed; also that some device should be arranged which would aid the headman in ascertaining that only ten men are on the carriage.

We also find that the thirteen men came to their death by falling down the shaft, said accident being due to forcing out of a portion of the bottom of the cage; and after consideration of all the testimony and also an inspection of the shaft, cage, et cetera, we state that the cause is unknown to this jury."

In this connection attention is called to the table of accidents herewith.